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occupying the position of a metacarpal, must be considered as its degenerate representative, even if not articulating with the carpus or metacarpus by means of an arthrodial facet. This assumption would seem to be borne out by such cases as those of the telemetacarpal deer, in which the distal portions alone of the second and fifth metacarpals are present, and there is no articulation whatever with the cannon bone.

Would it not also be equally correct to deny the right of the 'spurious hoofs' in bison to be called phalanges because they have no connection whatever with the metacarpals?

Now, in *Bison americanus* there is in every 'rough skeleton' examined a bone about ten millimetres in length, occupying the place of the second metacarpal. Although this bone very rarely exhibits the slightest trace of an arthrodial facet, it is nevertheless, from my stand-point, to be considered as a rudimentary metacarpal. If not a metacarpal, what is it? In two skeletons out of six, there is a small facet on one leg only, but the little bone above mentioned is the bony core of a symmetrically shaped

The maxillo-palatines of *Tachycineta*.

The person who 'found fault' with Dr. Shufeldt's figure of *Tachycineta thalassina* (see *Science*, ix. No. 221) would like to say a few words by way of explanation. I regret that my remarks should have been construed as mere fault-finding. Nothing was further from my intentions, and I should be extremely sorry to have requited the many courtesies received at the hands of Dr. Shufeldt in any such manner. The shape of the maxillo-palatines of *Tachycineta* constituted one of the links in the chain of Dr. Shufeldt's argument; and, as my own conclusions in the subject under discussion were quite different from his, it was needful for me to point out any flaws, either of text or figure, which had a bearing on the subject. While, at the time of writing the 'Affinities of *Chaetura*,' there was no specimen of *T. thalassina* at my disposal, I did have many specimens representing every other species of North American swallow. All of these agreed with one another in the shape of the maxillo-palatines, and

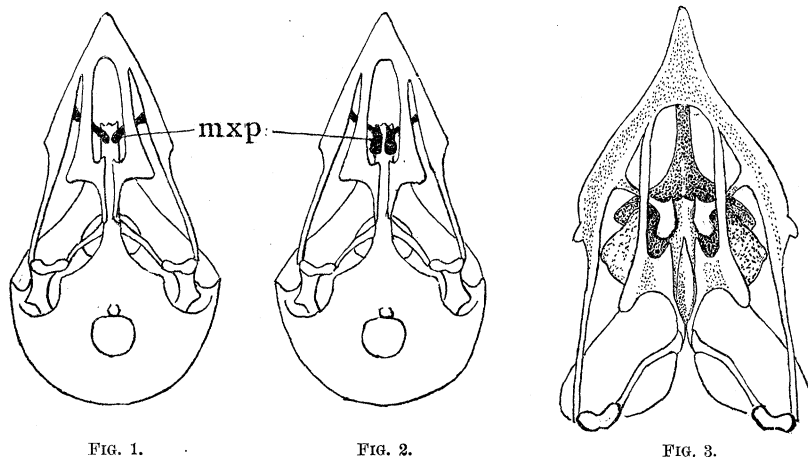


FIG. 1.

FIG. 2.

FIG. 3.

cartilaginous mass very like the better-developed fifth metacarpal.

Examination of the skeleton of aurochs in the U.S. national museum shows that the facets for the articulation of the fifth metacarpal are much larger and more sharply defined than are those for the articulation of the second.

Owen notes that the genus *Bison* has two small metacarpals, and it would seem safe to assume that this is the normal number, the Cambridge skeleton being in this respect abnormal.

The deductions that I would make are these:—

1. *Bison bonasus* possesses two rudimentary metacarpals, both of which articulate with the cannon bone by arthrodial facets.

2. *Bison americanus* possesses two rudimentary metacarpals, but the outer one alone regularly articulates with the cannon bone.

To Dr. Slade, however, belongs the credit of pointing out that in this respect the American and European bison are different, and that the American is just a shade more modified.

FREDERIC A. LUCAS.

Washington, D.C., April 29.

differed *in toto* with those of the skull figured by Dr. Shufeldt. On the strength of these facts, I ventured to state that the figure was imperfect in this particular; and a skull of *T. thalassina* since procured has the maxillo-palatines like those of its relatives. Of the accompanying figures, fig. 1 is a tracing of Dr. Shufeldt's figure in the Proceedings of the zoological society, fig. 2 is the same figure with the maxillo-palatines drawn from a specimen in the national museum, while fig. 3 represents the palate of the purple martin (*Progne subis*), which shows the characteristic form of the Maxillo-palatines in the swallows. Fig. 2 is not quite so good as I would like, but there is no time to make a better figure. In the examination of scores of crania, representing many species of birds, I have never met with a single case of individual variation of the maxillo-palatine process, to say nothing of so great a departure from the specific type as that indicated in Dr. Shufeldt's figure. In fact, the shape of this process has been found very constant in closely allied species, all the thrushes examined having one pattern, the wrens another, and so on. This being the case, it would

seem unfortunate that the skull in the Proceedings of the zoölogical society should have been figured as a *typical* cranium, and that no mention should have been made of the fact that it was aberrant in so important a particular. FREDERIC A. LUCAS.

Washington, D.C., May 3.

Some trees.

In September of 1885, I was present at and assisted in the following measurements of an iron or lever-wood tree (*Ostry virginica*) on the grounds of Lyman Child, Esq., near Bethel village in Vermont: circumference at ground, 128 inches; one foot above ground, 83 inches; four feet above ground, 69 inches; with corresponding diameters of 3 feet 7 inches, 2 feet 7 inches, and 1 foot 11 inches; height of tree, 38 feet; lateral extent of branches, 47 feet. It stands on a barren, precipitous hillside, and can find nutriment in little else than the disintegrated granite rock. In much travel and a long life in east and west, I have never seen one but this, of even one-half this size.

At Excelsior Springs in Clay county, Mo., some thirty miles from Kansas City, stands a maple (*Acer Sach*) and white-oak (*Quercus alba*) joined in one symmetrical body, from the ground up about six feet; thence dividing into two separate trees of some fifteen to eighteen inches diameter each. The line of union of the bodies is only indicated by a slight crowding of the bark.

Near the same Excelsior Springs an oak and maple of some twelve inches diameter each, stand at the ground two feet apart. At about fifteen feet above the ground, in their earlier growth, a limb from the maple was projected horizontally across the body of the oak. Time and growth have embedded the limb from the maple in the body of the oak; and now the appearance is, on the one side of the oak, an anastomosis with the maple by a three-inch arm, and, on the other side, a two-inch maple-limb produced from an oak-tree.

A slippery-elm tree (*Ulmus fulva*) stands in our yard here in Kansas City, of some thirty inches diameter, at one foot from the ground, and averaging twenty inches for twenty feet upwards, and thence twelve inches for forty feet; entire height, about eighty feet. I find no such *Ulmus fulva* in Gray; but its sweetish, mucilaginous inner bark pronounces it a real *fulva*. Its terminal branches, often in whorls of from three to seven, are blunt and club-like, unlike the light pendant terminals of many of the American or white elms. Other specimens of this elm are in the vicinity, but not often so symmetrical in form. A. L. CHILD, M.D.

Kansas City, Mo., May 3.

The Daniel Scholl observatory.

It occurred to me that it might be of interest to you and your readers to hear that in the old historic town of Lancaster City, Penn., an observatory named the Daniel Scholl observatory has been erected on the grounds of Franklin and Marshall college. The equipments consist of meteorological apparatus, chronometer, Seth Thomas thirty-day regulator, chronograph, transit instrument of three inches aperture, and a Clark-Repsold equatorial telescope of eleven inches aperture. The telescope has a set of negative and positive eye-pieces, with reversion prisms for three of the micrometer eye-

pieces, a Mertz solar eye-piece, and a comet eye-piece, together with a micrometer with complete illuminating apparatus for bright and dark field as worked out by the Repsolds. Since this is comparatively new, and, as far as we know, the only micrometer and purely equatorial mounting by Repsold in this country, we thought it might be of some interest to those who have not had the opportunity to see this form of mounting and micrometer.

JEFFERSON E. KERSHNER.

Lancaster City, Penn., May 7.

Death of Prof. William Ashburner.

William Ashburner, the well-known mining engineer of San Francisco, died in that city, April 20, after a brief illness. The deceased held a high place in his profession, and was greatly esteemed by all who knew him. He was born in Stockbridge, Mass., in 1831. He attended the public schools of his native town. In 1849 he entered the Lawrence scientific school at Cambridge, and after two years went to Paris, where he pursued such studies as are requisite to the profession of mining engineer, at the Ecole des mines. In 1854 he returned to this country, and, accompanied by the late Professor Rivot, he devoted several months to the examination of the mineral region of Lake Superior. In 1859 he was engaged in the exploration of a part of the island of Newfoundland, and in 1860 he went to California as one of the chief assistants in the state geological survey of which Prof. J. D. Whitney was the director. In 1864 he was appointed one of the commissioners of the Yosemite Valley and the Mariposa Big-Tree Grove, a position he held until 1880. From 1862 until 1883 Professor Ashburner was actively engaged in his professional work, and travelled almost incessantly in the mining districts of the United States, British Columbia, and Mexico, also in the more distant regions of South America and Asia.

In 1874 he was made professor of mining in the University of California, and subsequently honorary professor of mining in the same college. In 1880 he was appointed by the governor, regent of said university, and was a member of the board of regents at the time of his death. He was selected by the late James Lick as one of the trustees of the California school of mechanical arts, this latter being one of Mr. Lick's public benefactions, and was also chosen by Mr. Stanford one of the trustees of the Leland Stanford, jun., university. Professor Ashburner was otherwise prominent in various scientific and educational societies, particularly in the California academy of sciences, in which for many years he was one of the trustees. He was also a member of the microscopical, historical, and geographical societies of San Francisco.

In the community in which he lived for so many years, he was universally recognized as a public-spirited and honorable gentleman. His quiet and unostentatious manners, as well as other agreeable personal qualities, endeared him to a large circle of friends.

The enthusiastic and active interest he took in every thing conducive to the growth and intellectual advancement of the Pacific coast made him a valuable citizen, and his death may well be regarded as a public loss.

R. E. C. S.

Smithsonian institution, Washington, May 9.